BEFORE

THE PUBLIC SERVICE COMMISSION OF

SOUTH CAROLINA

DOCKET NO. _____

In the Matter of	)
	)
Amended Project Development Application of	)
Duke Energy Carolinas, LLC	)
for Approval of Decision to Incur Nuclear	)
Generation Pre-Construction Costs	)
	)

DIRECT TESTIMONY OF

JANICE D. HAGER

FOR DUKE ENERGY CAROLINAS, LLC

I. INTRODUCTION AND PURPOSE

Q. PLEASE STATE YOUR NAME, ADDRESS AND POSITION WITH DUKE ENERGY CORPORATION.

A. My name is Janice D. Hager. My business address is 526 South Church Street, Charlotte, North Carolina. I am Vice President, Integrated Resource Planning and Regulated Analytics for Duke Energy Business Services LLC, the service company subsidiary of Duke Energy Corporation (collectively "Duke Energy") and an affiliate of Duke Energy Carolinas, LLC ("Duke Energy Carolinas" or the "Company").

Q. WHAT ARE YOUR JOB RESPONSIBILITIES?

A. As Vice President, Integrated Resource Planning and Regulated Analytics, I am responsible for planning for the long-term capacity and energy needs of the Duke Energy operating utilities, including the Duke Energy Carolinas system. My responsibilities include supervising the preparation and filing of integrated resource plans ("IRPs") in accordance with state regulations.

Q. PLEASE SUMMARIZE YOUR EDUCATIONAL BACKGROUND AND PROFESSIONAL EXPERIENCE.

A. I am a civil engineer, having received a Bachelor of Science in Engineering from the University of North Carolina at Charlotte. I began my career at Duke Power Company (now known as Duke Energy Carolinas) in 1981 and have had a variety of responsibilities across the Company in areas of piping analyses, nuclear station modifications, new generation licensing, and rates and regulatory affairs, including serving as Vice President, Rates and Regulatory Affairs for Duke Energy Carolinas.

Following the merger between Duke Energy and Cinergy in 2006, I became Managing Director of Integrated Resource Planning for the regulated jurisdictions. Since that time, several groups involved in regulated generation analytics were added to my responsibility. I was named to my current role in October 2009. I am a registered Professional Engineer in North Carolina and South Carolina.

Q. DID YOU PREVIOUSLY CAUSE TESTIMONY TO BE FILED IN DOCKET NO. 2007-440-E?

A. Yes. I previously filed testimony in March 2008 in support of the Company's original Application for Approval of Decision to Incur Nuclear Generation Pre-Construction Costs (the "Application").

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my testimony on the Company's Amended Application is to discuss how the 2010 Duke Energy Carolinas IRP, filed in Docket No. 2010-10-E, supports the Company's decision to continue the development of Lee Nuclear Station.

Q. PLEASE DESCRIBE THE EXHIBITS TO YOUR TESTIMONY.

A. My testimony includes four exhibits: Hager Exhibit A shows Duke Energy Carolinas' existing resources and resource requirements to meet the load obligation, plus the 17% target planning reserve margin, over the planning period of the IRP. Hager Exhibit B illustrates the capacity and energy mix of the Company's existing resources for 2011, and Hager Exhibit C provides the capacity and energy mix for the Company's projected future resources for 2030. Hager Exhibit D provides a cost comparison of the future resource portfolios analyzed under the 2010 IRP.

Q. WERE HAGER EXHIBITS A-D PREPARED BY YOU OR UNDER YOUR SUPERVISION AND DIRECTION?

A. Yes.

II. 2010 IRP SUPPORT FOR LEE NUCLEAR STATION

Q. PLEASE PROVIDE AN OVERVIEW OF THE COMPANY'S INTEGRATED RESOURCE PLANNING PROCESS.

A. As I have previously testified in Docket No. 2007-440-E, the integrated planning process begins with a 20-year load forecast. The forecast includes projections of summer and winter peak demands, as well as energy use. Information is gathered for Duke Energy Carolinas' existing resources, including Company-owned generation, purchased power agreements, and demand-side/energy efficiency resources. The information includes items such as capacity rating, heat rate, fuel costs, and emission allowance costs. Data is gathered on the costs of additional resource options to meet customer needs. Such data includes lead times for construction, capacity costs, fixed and variable operating and maintenance costs, and emissions costs for generation, as well as the costs of demand-side options. Quantitative analyses are conducted to identify combinations of options that will meet customer energy needs (plus reserve margin), while minimizing the costs to customers. The 2010 IRP incorporates a target planning reserve margin of 17%, which Duke Energy Carolinas' historical experience has shown to be sufficient based on the prevailing expectations of reasonable lead times for the development of new generation, siting of transmission facilities and procurement of purchased capacity. These quantitative analyses enable the Company to identify potential

portfolios that can be tested under base assumptions, and for sensitivities and scenarios around those base assumptions.

Q. WHAT ARE THE OBJECTIVES OF THE IRP?

A. Duke Energy Carolinas' resource planning process seeks to inform the Company's decision-making over the short and long-term to ensure there is a safe, reliable, reasonably priced supply of electricity to meet customer needs regardless of how these uncertainties unfold. The comprehensive planning process considers a wide range of assumptions, including those required to comply with statutory and regulatory mandates and uncertainties, and develops an action plan that preserves the options necessary to meet customers' needs.

Q. ARE DECISIONS REGARDING RESOURCE PLANNING MADE ON THE BASIS OF QUANTITATIVE ANALYSES ALONE?

A. No. Consistent with the responsibility to meet customer energy needs in a reliable and economic manner, the Company's resource planning approach includes both quantitative analysis and qualitative considerations. Quantitative analysis provides insights on the potential impacts of future risks and uncertainties associated with fuel prices, load growth rates, capital and operating costs, and other variables. Qualitative perspectives, such as the importance of fuel diversity, the Company's environmental profile, the stage of technology deployment, and regional economic development, are also important factors to consider as long-term decisions are made regarding new resources.

Company management uses all of these perspectives and analyses to ensure that Duke Energy Carolinas will meet near-term and long-term customer needs,

while maintaining flexibility to adjust to evolving economic, environmental, and operating circumstances in the future. The environment for planning the Company's system continues to present significant challenges from a fuel, regulatory, and legislative perspective. As a result, the Company believes prudent planning for customer needs requires a plan that is robust under many possible future scenarios. At the same time, it is important to maintain a number of options to respond to many potential outcomes of major planning uncertainties (e.g., federal greenhouse gas emission legislation/regulation, changes in fuel pricing, etc.).

Q. WHAT ADDITIONAL SYSTEM RESOURCE NEEDS DID THE 2010 IRP IDENTIFY OVER THE PLANNING HORIZON?

A. Before the impact of energy efficiency programs is included, the current load forecast reflects a 1.8% average annual growth in both summer and winter peak demands, and a 2.0% average annual increase in total energy usage over the twenty-year planning horizon. These percentages equate to an average annual growth rate of approximately 360 megawatts ("MWs") per year of peak demand and 2,100,000 megawatt-hours per year. In addition, there are some existing resources that will no longer be available to meet our customers' needs. Each MW of capacity that is no longer available must be replaced with new capacity, either from supply-side or demand-side resources. Hager Exhibit A shows the existing resources and resource requirements to meet the load obligation, plus the 17% target planning reserve margin.

The need for additional capacity grows over time due to load growth, unit capacity adjustments, unit retirements, and expirations of purchased-power

contracts. The need grows to approximately 2,200 MW by 2020 and to 6,000 MW by 2030. As I discuss later, the plan is to meet that projected need with a diverse array of resources – traditional and renewable generation, as well as demand response and energy efficiency resources.

Q. WHAT IMPACT DOES THE PRICE OF NATURAL GAS HAVE ON THE COMPANY'S ANALYSIS FOR THE IRP?

A. The projected costs of natural gas are a key input assumption into the Company's analysis. The projected cost of natural gas has dropped significantly over the past year or so, primarily due to expectations regarding shale gas availability. The projection of natural gas prices used in the 2010 analysis are 23% lower on average and 35% lower by 2025 than those used in Duke Energy Carolinas' 2009 IRP analysis.

As noted by Duke Energy Carolinas Witness James Rogers, questions remain regarding access to the new domestic reserves of shale natural gas that are driving the new supply estimates. Consequently, uncertainty exists regarding natural gas availability and pricing over the long term. However, Duke Energy Carolinas' resource plans reflect Mr. Rogers' testimony that natural gas resources, like new nuclear resources, are only a part of the diversified future energy mix necessary for Duke Energy Carolinas to provide affordable, reliable and clean electricity to its customers over the coming decades.

Q. DID DUKE ENERGY CAROLINAS CONSIDER A RANGE OF POSSIBLE CARBON ALLOWANCE PRICES IN THE 2010 IRP?

A. Yes. As with projected fuel pricing, projected carbon allowance pricing is a key input assumption in the Company's IRP analysis. As Mr. Rogers references in his testimony, Duke Energy Carolinas is planning for a carbon-constrained future and must plan to meet customer needs under a variety of scenarios. For its 2010 IRP analysis, the Company considered a range of CO_2 prices as sensitivities in its evaluation of each potential resource portfolio. The ranges were based upon the various federal legislative "cap and trade" proposals, and also included a sensitivity for potential federal "clean energy" legislation that does not have a CO_2 allowance "cap and trade" mechanism, but instead is based on a federal clean energy standard, which includes an energy efficiency and renewable portfolio standards with allowances for new nuclear generation. The Company's 2010 fundamental CO_2 allowance price forecast is lower than its 2009 forecast primarily due to projection of lower natural gas prices, increased coal retirements, lower loads, and increased projections with regard to the ability to use international and domestic offsets to meet CO_2 reduction mandates.

As Duke Energy Witness James Rogers states in his testimony, new nuclear resources are a necessary piece of the puzzle for Duke Energy Carolinas to meet its customers' electricity needs over the long term regardless of the uncertain future of carbon legislation. He notes the significant benefits of base load, emissions free nuclear generation from a system planning perspective. As Mr. Rogers notes, even in the absence of carbon legislation, Duke Energy Carolinas must modernize and de-carbonize its resource options over the coming decades to retain its ability to provide affordable, reliable and clean electricity to all of its customers.

Q. DID DUKE ENERGY CAROLINAS CONSIDER ENERGY EFFICIENCY AND DEMAND-SIDE RESOURCES IN THE 2010 IRP?

A. Yes. Projected load impacts for energy efficiency ("EE") and demand-side management ("DSM") resources were developed for the base case based on the settlements in the respective proceedings before this Commission and the North Carolina Utilities Commission ("NCUC") for approval of the Company's Energy Efficiency Plan (Docket No. 2009-226-E and NCUC Docket E-7, Sub 831). The conservation impacts were assumed at 85% of the target impacts from the proposed settlement. The Company assumes total efficiency savings will continue to grow on an annual basis through 2021, however, the components of future programs are uncertain at this time and will be informed by the experience gained under the current plan. This level of DSM/EE accomplishments was cost-effective in the screening stage of the analysis and thus was included in all portfolios.

In addition, a high case scenario was developed which uses the full target impacts of the save-a-watt bundle of programs for the first five years and then increases the load impacts at 1% of retail sales every year after that until the load impacts reach the economic potential identified by the 2007 market potential study. This level of DSM/EE accomplishments was also cost-effective if there is equal participation among residential, commercial, and industrial customers.

Q. DID DUKE ENERGY CAROLINAS CONSIDER RENEWABLE ENERGY RESOURCES?

A. Yes. In 2007, the State of North Carolina enacted a Renewable Energy and Energy Efficiency Portfolio Standard ("REPS"). As a result, Duke Energy

Carolinas modified its consideration of renewable energy resources. In the 2010 IRP, the level of renewable resources necessary for compliance with North Carolina's REPS statute (N.C. Gen. Stat. § 62-133.8) and NCUC Rules was included in each portfolio. The assumptions for North Carolina retail customers for planning purposes are as follows:

Overall Requirements/Timing

- 3% of 2011 load by 2012
- 6% of 2014 load by 2015
- 10% of 2017 load by 2018
- 12.5% of 2020 load by 2021

Additionally, requirements were applied to South Carolina retail loads, as well as for certain wholesale customers, to take into account the potential that a South Carolina or federal Renewable Portfolio Standard may be imposed. A portion of the renewable requirements was assumed to be provided by EE, co-firing biomass in some of Duke Energy Carolinas' existing units, and by purchasing Renewable Energy Certificates from out of state, as allowed in the statute and rules. The 2010 IRP includes 125 MW of on peak contribution from renewable energy by 2012 and approximately 520 MW by 2030.

Q. PLEASE DESCRIBE DUKE ENERGY CAROLINAS' EXISTING GENERATION RESOURCE PORTFOLIO MIX.

A. Duke Energy Carolinas' generation portfolio is composed of over 21,000 MWs of generation capacity. As shown on the charts below in Hager Exhibit B, although Duke Energy Carolinas' capacity mix is roughly one-third coal, one-third nuclear, and one-third hydroelectric and gas-fired, the energy mix is roughly 50% nuclear and 40% coal-fired generation.

Q. WHAT ASSUMPTIONS DOES DUKE ENERGY CAROLINAS MAKE IN ITS 2010 IRP RELATIVE TO RETIREMENT OF EXISTING GENERATION?

A. The 2010 IRP assumes the retirement of 370 MWs of our oldest (1960's vintage) combustion turbines, as well as the retirement of 1667 MWs of coal-fired generation, representing all of the Company's coal-fired generation resources without installed flue gas desulfurization facilities (also known as "SO2 scrubbers"), by 2015. The projected coal retirements are driven by the conditions set forth in the North Carolina Utilities Commission's *Order Granting Certificate of Public Convenience and Necessity With Conditions* in Docket No. E-7, Sub 790 (March 21, 2007)("Cliffside Order")[1] and the anticipated impact of a series of new proposed U.S. Environmental Protection Agency ("EPA") rules regulating multiple areas relating to generation resources, such as mercury, SO_2, NOx, coal combustion by-products and fish impingement/entrainment. These new EPA rules, if implemented, will increase the need for the installation of additional environmental control technology or retirement of coal fired generation in the 2014 to 2018 timeframe. Although the Company has not made a firm decision as to when this generation will be retired, in anticipation of these increased control requirements, the Duke Energy Carolinas 2010 IRP incorporates a planning assumption that all coal-fired generation that does not have an installed SO_2 scrubber will be retired by 2015.

[1] The Cliffside Order requires the retirement of the existing Cliffside Units 1-4 no later than the commercial operation date of the new unit, and retirement of older coal-fired generating units (in addition to Cliffside Units 1-4) on a MW-for-MW basis, considering the impact on the reliability of the system, to account for actual load reductions realized from the new EE and DSM programs up to the MW level added by the new Cliffside Unit 6.

Q. HOW DOES BUILDING ADDITIONAL NUCLEAR GENERATION AFFECT THE DIVERSITY OF THE PORTFOLIO?

A. As noted above, Duke Energy Carolinas is planning on adding significant amounts of renewable and DSM/EE resources over the next 20 years. These efforts, even when considered in combination with the additions of the 825 MW new advanced clean coal Cliffside Unit 6 and the 620 MW (each) Buck and Dan River combined cycle facilities, will still not provide enough resources to meet future customer demands. Given the pending retirements of the Company's coal-fired generation assets, the projected load growth over time, and the expiration of purchased power contracts, additional generating capacity will be required to ensure a reliable supply of power.

Current options other than renewable and DSM/EE resources for meeting resource needs are coal, nuclear, and natural gas. Due to current environmental standards for new coal generation resources and the potential for a carbon price or clean energy standard, new coal resources are not a cost-effective long-term resource option at this time. Thus, the Company is left with natural gas-fired generation as a possible generation alternative to new nuclear resources. As Witness Rogers describes in his testimony, the Company considers natural gas to be a component piece of the long-term supply solution, but it is not, by itself, the answer. A diverse portfolio of resources, including both natural gas and nuclear resources, will allow the Company to balance the risk of fuel volatility and minimize costs to customers over the long term. Thus, the continued development of Lee Nuclear Station would allow for continued diversification of

resources and less dependence on greenhouse gas-emitting resources, which is a benefit to all customers. This is illustrated in Hager Exhibit C, which shows that the percentage of nuclear capacity and energy in 2030 remains the same as in 2011, even with the addition of Lee Nuclear Station.

Q. WHY IS DIVERSITY OF RESOURCES IMPORTANT FROM A RESOURCE PLANNING PERSPECTIVE?

A. Resource diversity is important in ensuring a reliable and cost-effective supply of electricity for the Company's customers. Duke Energy Carolinas' customers' use of electricity varies widely from day to night and season-to-season. It is therefore important to have resources with different operating characteristics. The Company's baseload units, such as the current nuclear fleet, are designed to operate continually, except for occasional outages for maintenance or refueling. Others resources, like natural gas-fired combustion turbines, are designed to be ready to meet the Company's peak loads on short notice. Duke Energy Carolinas must have a spectrum of resources that can ramp up and down as load varies, resources that can start with seconds or minutes notice, and resources that can start from a battery in case of a loss of power (black start capability). There is no one resource type that can meet all of these needs.

Additionally, resource diversity helps to ensure cost-effectiveness of the Company's resource mix. Resource planning is not about predicting the future; it is about being prepared for whatever the future holds. Although the Company diligently seeks to project future fuels and emission allowance costs and future regulatory and legislative actions that could impact the operation of resources, the

actual outcome is uncertain. Resource diversity serves as a risk mitigant; it serves to ensure that all of our resource "eggs" are not in one basket such that Duke Energy Carolinas' future operations and the ultimate cost borne by its customers are not specifically tied to one particular fuel source.

Q. GIVEN THE ANALYSIS CONDUCTED WITH THESE CONSIDERATIONS IN MIND, WHAT WERE THE CONCLUSIONS OF THE 2010 IRP?

A. The results of the quantitative and qualitative analyses suggest that a combination of additional baseload, intermediate, and peaking generation, renewable resources, and EE and DSM programs are required to meet customer needs over the next 20 years. The near-term resource needs can be met with new EE and DSM programs, completing construction of the Buck, Dan River, and Cliffside Projects, as well as pursuing nuclear uprates and renewable resources.

In each IRP, the Company chooses one portfolio as "the plan" for showing that customer needs can be met over the 20-year planning period. Over the duration of the planning period, the portfolio chosen for the 2010 IRP is made up of 1,780 MW of new natural gas simple cycle capacity, 1,300 MW of combined cycle capacity, 2,234 MW of new nuclear capacity, 1,267 MW of Demand-Side Management, 633 MW of Energy Efficiency, and 520 MW of renewable resources. The portfolio also includes the Cliffside Unit 6 and Buck and Dan River CC Projects.

Q. SPECIFICALLY, WHAT DOES THE 2010 IRP CONCLUDE AS TO THE NEED FOR AND TIMING OF NEW NUCLEAR GENERATION?

A. Duke Energy Carolinas' 2010 IRP supports new nuclear generation as the best option to meet our customers' needs for future baseload generation. The IRP continues to show new nuclear generation as the best option for meeting Duke Energy's long-term baseload generating needs in both North Carolina and South Carolina under all scenarios analyzed. The need for new baseload generation, in particular, is demonstrated by the lower cost to customers of the portfolios that include new nuclear capacity than those portfolios that included only new natural gas-fired generation, which would be dispatched as peaking and intermediate units.

The results for all these analyses and descriptions of the subject resource scenarios are included in Hager Exhibit D. As the Exhibit shows, the results of the IRP analysis show the benefits to customers of either full ownership of Lee Nuclear Station or shared ownership. The conclusions of the IRP demonstrate that the 2020 time frame for new nuclear generation remains beneficial for Duke Energy Carolinas' customers; it creates the optimal result in meeting the Company's obligation to supply power at the least cost to its customers and builds in the opportunity to develop partners and pursue legislation to ensure Lee Nuclear Station is brought on line at the lowest possible cost.

Q. HOW DO THE CONCLUSIONS FROM THE 2010 IRP COMPARE TO THOSE OF THE 2007 PLAN WHICH WAS THE BASIS OF YOUR TESTIMONY IN DOCKET NO. 2007-440-E?

A. The 2007 and 2010 IRPs, as well as the 2008 and 2009 IRPs, strongly supported the need for Lee Nuclear Station as a critical part of Duke Energy Carolinas'

future resource mix. Each plan was based on the best information available at the time. As the Company has included updated information in each IRP, the basic conclusion of the Company's analysis is the same; the continued development of Lee Nuclear Station as a future resource option is in the best interest of Duke Energy Carolinas and its customers.

III. CONCLUSION

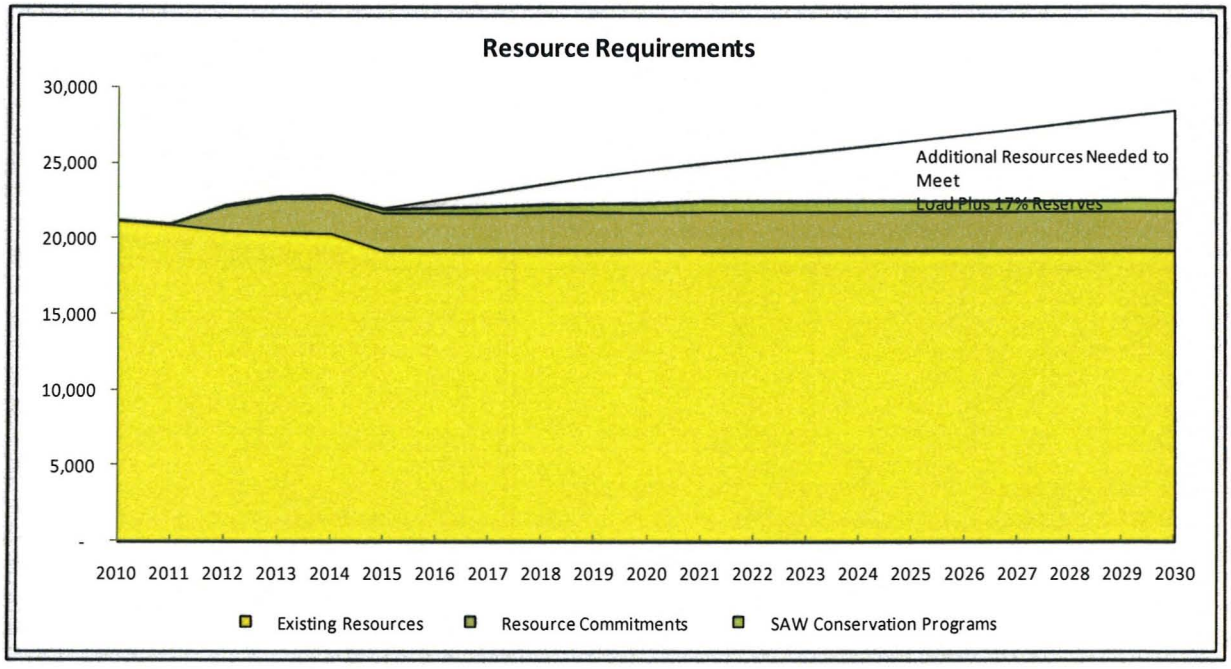
Q. IN CONCLUSION, WHY IS THE CONTINUED DEVELOPMENT OF LEE NUCLEAR STATION IMPORTANT TO DUKE ENERGY CAROLINAS' FUTURE RESOURCE PLANNING?

A. Lee Nuclear Station would provide needed, reliable and greenhouse gas emission-free base load generation for Duke Energy Carolinas. Given the uncertainties posed by future economic, environmental, regulatory, and operating circumstances, continuing to develop new nuclear generation as a resource option in the 2020 timeframe is prudent. The Company's IRP analysis demonstrates that Lee Nuclear Station has significant value for customers under multiple scenarios. For all the reasons stated previously, I believe Duke Energy Carolinas' decision to incur continued pre-construction costs for Lee Nuclear Station is prudent and reasonable.

Q. DOES THIS CONCLUDE YOUR PRE-FILED DIRECT TESTIMONY?

A. Yes.

HAGER EXHIBIT A



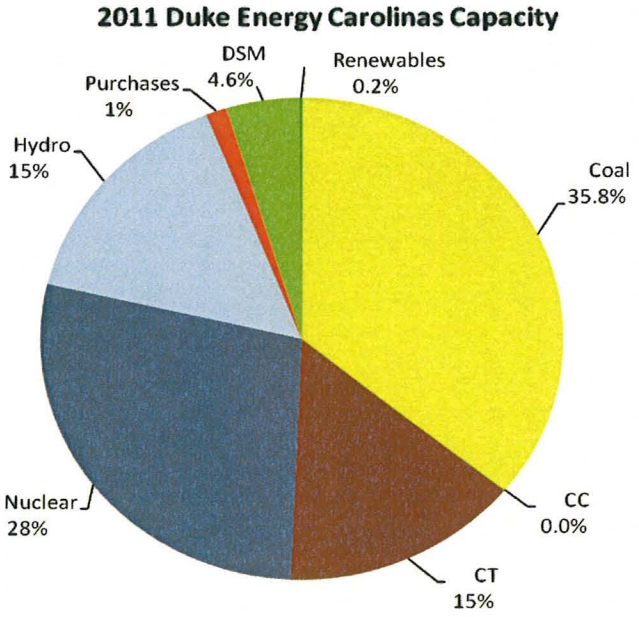
Cumulative Resource Additions To Meet A 17 Percent Planning Reserve Margin (MWs)

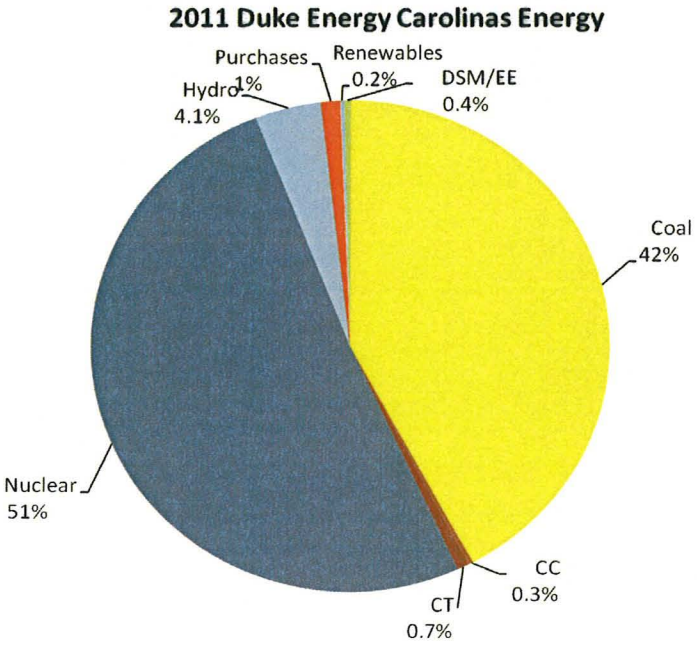
Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Resource Need	0	0	0	0	0	90	530	940	1350	1810

Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Resource Need	2220	2500	2870	3240	3620	4000	4390	4770	5170	5560	5970

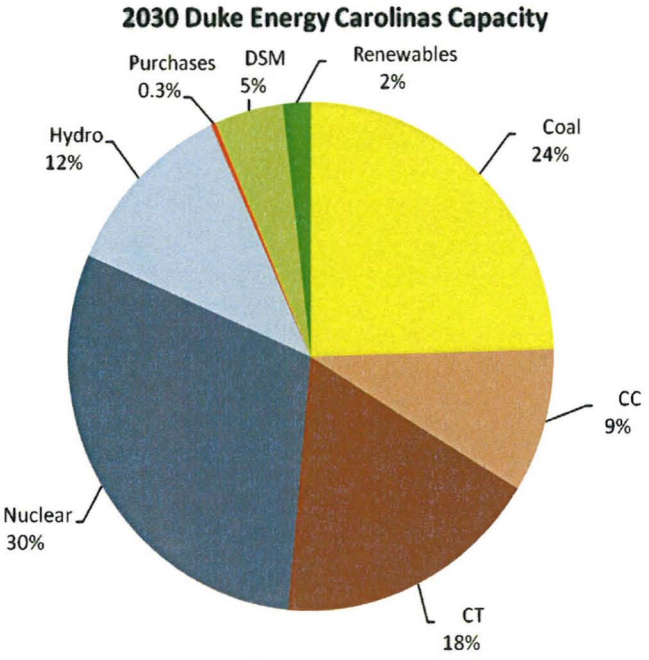
Assumptions made in the development of Hager Exhibit A include: (1) Cliffside 6 is built by the summer of 2012 and therefore included in Resource Commitments; (2) Coal retirements associated with the Cliffside Unit 6 ruling and permits, Buck Units 5&6, and Lee Steam Station are included; (3) Retirement of the old fleet combustion turbines; (4) Conservation programs associated with the save-a-watt program are included; (5) DSM programs associated with the save-a-watt program are included; (6) Buck/Dan River combined cycle facilities are included in Resource Commitments; (7) Renewable capacity is built or purchased to meet the NC REPS.

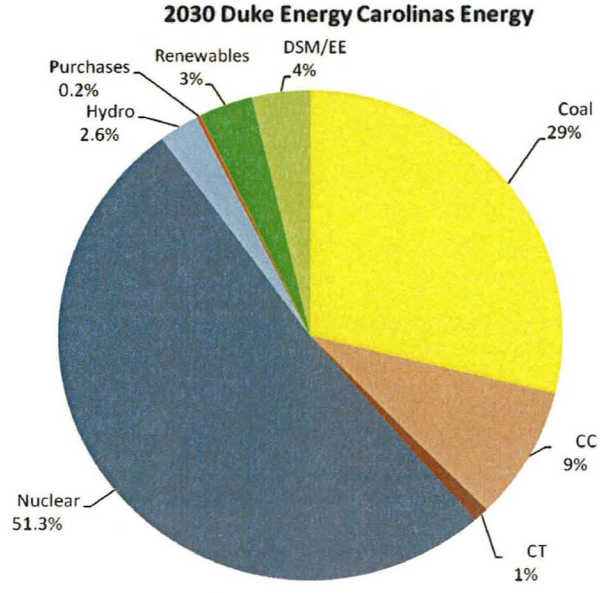
HAGER EXHIBIT B





HAGER EXHIBIT C





HAGER EXHIBIT D

COMPARISON OF NUCLEAR PORTFOLIOS TO THE CT/CC PORTFOLIO (COST ARE REPRESENTED IN $BILLIONS)

	Reference Case	CO2 Price Sensitivity		Fuel Sensitivity	
Portfolio		Kerry/ Lieberman	2009 Fundamental	High Fuel Cost	Low Fuel Cost
2 Nuclear Units (2021-2023)	(1.8)	(2.8)	(5.0)	(5.5)	
Natural Gas					(0.6)
		Load Sensitivity		Nuclear Capital Cost Sensitivity	
	High Load	Low Load	High DSM	20% Increase	10% Decrease
2 Nuclear Units (2021-2023)	(1.9)	(1.2)	(1.6)		(2.9)
Natural Gas				(0.5)	
Favorable Financing		Clean Energy Bill		Timing	
Portfolio	FLG & PTCs	Portfolio		Portfolio	
2 Nuclear Units (2021-2023)	(4.4)	1 Nuclear Unit (2021)	(0.7)	2 Nuclear Units (2026-2028)	(1.9)
Natural Gas		Natural Gas		Natural Gas	